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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,719	11/09/2001	John C. Tsai	60617.300901	8874

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EXAMINER
CONNELLY CUSHWA, MICHELLE R

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 09/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/007,719	TSAI ET AL.	
	Examiner	Art Unit	
	Michelle R. Connelly-Cushwa	2874	

-- The MAILING DATE of this communicati n appears on the c ver sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 June 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8,11-23,25,28-39,42-53 and 56-60* is/are rejected.

7)☒ Claim(s) *7,9,10,24,26,27,40,41,54 and 55* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

Applicant's Amendment filed June 20, 2003 has been fully considered and entered.

Information Disclosure Statement

The prior art documents submitted by applicant in the Information Disclosure Statement filed on February 14, 2003 have all been considered and made of record (note the attached copy of form PTO-1449).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-6, 8, 11-23, 25, 28-39, 42-53 and 56-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grann et al. (US 6,212,312 B1).

Regarding claims 1-6, 8, 11-13, 35-39 and 42-44; Figure 3 of Grann et al. discloses a multiplexing system comprising:

- at least two input light beams each having respective light wavelengths (λ1, λ2, λ3, λ4, λ5); and
- an optically multi-dimensional grating suitable for receiving the input light beams (λ1, λ2, λ3, λ4, λ5) and diffracting at least one of the light wavelengths to form a single output light beam (λ1,λ2,λ3,λ4,.....λn),

thereby multiplexing the light wavelengths such that they are present in the output light beam;

- wherein one of the light wavelengths from one of the input light beams may be a principal wavelength (λ2, λ3, λ4 or λ5), and another of the light wavelengths from another of the input light beams is a diffractable wavelength (λ1, λ2, λ3 or λ4), and the multi-dimensional grating is arranged such that the principal wavelength is received and passed through a portion of the grating and the diffractable wavelength is received and combined with the principal wavelength;
- wherein the principal wavelength may be a plurality or range of wavelengths (λ2, λ3, λ4 or λ5), thereby producing the output light beam with an addition of a diffractable wavelength (λ1) into the plurality or range of wavelengths;
- wherein the multi-dimensional grating has characteristics suitable for diffracting a plurality or range of wavelengths concurrently;
- wherein the multi-dimensional grating is a cubical grating formed by a plurality of planar gratings (10a, 10b, 10c, 10d, 10e), such that a multi-dimension planar grating (10a) receives passes some wavelengths (λ2, λ3, λ4, and λ5) and diffracts another wavelength (λ1);
- wherein the multiplexing system includes a plurality of multi-dimensional gratings (10a, 10b, 10c, 10d, 10e) and includes a plurality of input light signals (λ1, λ2, λ3, λ4, λ5) such in number that each multi-

dimensional grating has at least one input light signal providing its respective wavelength to that multi-dimensional grating;

- wherein the plurality of multi-dimensional gratings (10a, 10b, 10c, 10d, 10e) are physically discrete and integrated into one contiguous physical unit; and
- wherein the light wavelengths (λ1, λ2, λ3, λ4, λ5) including a range of wavelengths that are diffracted in the multi-dimensional grating.

Grann et al., however, does not specifically disclose at least two light sources or at least one light source that provides multiple wavelengths. In column 3, lines 45-54, however, Grann et al. teaches that multiplexing is the conversion of multiple signals to signals transmitted by a single channel. The multiple signals (λ1, λ2, λ3, λ4, λ5) are inherently provided by light sources. Light sources that produce either single or multiple wavelengths are well known and commonly used in the art to produce optical signals for optical networks that include multiplexers and demultiplexers. Therefore, one of ordinary skill in the art would have found it obvious to use either multiple or single light sources to generate the multiple light signals (λ1, λ2, λ3, λ4, λ5) in the invention of Grann et al., since the light signals must inherently be provided by a light source; Grann et al. does not disclose that any specific light source is to be used; the practice of selecting appropriate light sources to provide light signals is very elementary and within the level of ordinary skill in the art; and it appears that the invention would

perform equally well regardless of the specific light sources used to provide the signals.

Regarding claims 14-17 and 45-48; Grann et al. teaches all of the limitations of these claims as applied above. The multiplexing system disclosed in Figure 3 of Grann et al. includes:

- input light beams having respective wavelength sets (λ1, λ2, λ3, λ4, λ5) comprising a plurality of wavelengths of light;
- a plurality of multi-dimensional gratings (10a, 10b, 10c, 10d, 10e) suitably arranged to form at lest one and as many as three input grating blocks and an output grating block (10c, 10d and 10e may form input grating blocks and 10a, 10b and 10c may form an output grating block, or 10e-10n may form input grating blocks, while 10a, 10b, 10c and 10d may form an output grating block, the output grating block being comprised of two cubical gratings, the first being formed by 10a and 10b and the second being formed by 10c and 10d, for the multiplexing system disclosed by Grann et al.);
- wherein the input gratings blocks are suitably arranged to receive one of the input light beams and to diffractably provide its wavelength or wavelengths to the output grating block;

- wherein the output grating block is suitably arranged to receive the wavelengths from the input grating blocks and to diffractably combine the wavelengths such that they are present in the output light beam;
- wherein the multi-dimensional gratings (10a, 10b, 10c, 10d, 10e) are planar gratings and two input grating blocks provide wavelengths sets to the output grating block; and
- wherein the gratings in the output grating block are cubical gratings, formed from two or more of the planar gratings, and two, three or more of the input grating blocks provide the wavelength sets to the output grating block.

Grann et al., however, does not disclose that at least two light sources that provide the input beams have respective wavelength sets comprising a plurality of wavelengths are to be used. The signals (λ1, λ2, λ3, λ4, λ5) are inherently provided by light sources. Light sources that produce either single or multiple wavelengths are well known and commonly used in the art to produce optical signals for optical networks that include multiplexers and demultiplexers. Therefore, one of ordinary skill in the art would have found it obvious to use one or more of either light sources that produce single light wavelengths or light sources that produce multiple light wavelengths to generate the multiple light signals (λ1, λ2, λ3, λ4, λ5) in the invention of Grann et al., since the light signals must inherently be provided by a light source; Grann et al. does not disclose that any specific light source is to be used; the practice of selecting appropriate light

sources to provide light signals is very elementary and within the level of ordinary skill in the art; and it appears that the invention would perform equally well regardless of the specific light sources used to provide the signals. Thus, one of ordinary skill in the art would have found it obvious to use two or more light sources, wherein each light source provides input light beams having respective wavelength sets comprising a plurality of wavelengths of light in the invention of Grann et al.

Regarding claims 18–23, 25, 28-34, 49-53 and 56-60; Grann et al. discloses all of the limitations of claims 18-20 as applied above. The system disclosed in Figure 3 of Grann et al. also functions as a de-multiplexing system, wherein a light beam ($\lambda 1$, $\lambda 2$, $\lambda 3$, $\lambda 4$,..... λn) containing multiple wavelengths is input into the grating and principal wavelengths are passed through portions of the grating, while diffracted wavelengths are diffracted to form output light beams, thereby de-multiplexing the light wavelengths into respective output light beams ($\lambda 1$, $\lambda 2$, $\lambda 3$, $\lambda 4$, $\lambda 5$).

Allowable Subject Matter

Claims 7, 9, 10, 24, 26, 27, 40, 41, 54 and 55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Claims 7, 9, 10, 24, 26, 27, 40, 41, 54 and 55 are allowable for the reasons indicated in the Office action mailed March 19, 2003.

Response to Arguments

Applicant's arguments filed June 20, 2003 have been fully considered but they are not persuasive.

Regarding prior art rejections over Grann et al. (US 6,212,312 B1); Applicant first states the meaning of "multi-dimensional grating" seems to have caused considerable confusion and that to eliminate confusion with mere physical dimensions of which there are always three, the claims have been amended to emphasize that optically multi-dimensional gratings are meant. Applicant goes on to state that planar gratings can operate on at least two optical dimensions by control of cell-to-cell spacings in two physical dimensions and that cubical gratings employ cell-to-cell and/or surface-to-surface spacings in three physical dimensions.

Examiner disagrees that the phrase "optically multi-dimensional grating" clearly distinguishes over the gratings of the present art. The gratings disclosed in Figure 3 of Grann et al. receive a light beam (λ1, for example) in one direction and diffracts that light beam in a second, orthogonal direction. Thus, the grating disclosed by Grann et al. is optically multi-dimensional. In fact, diffraction gratings inherently diffract light in two dimensions.

In response to applicant's argument that the prior art fails to show certain features of applicant's invention, *it is noted that the features upon which applicant relies (i.e., the specific structure or physical characteristics of planar and/or cubical gratings as defined in the specification, meaning the cell-to-cell spacings and the surface-to-surface spacings that are controlled in two or more physical dimensions)*, are not recited in the

rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

As noted in MPEP § 2111, during patent examination, claims are given their broadest reasonable interpretation consistent with the specification. It is proper to use the specification to interpret what the applicant meant by a word or phrase recited in the claim. However it is not proper to read limitations appearing in the specification into the claim when these limitations are not recited in the claim. See *In re Paulsen*, 30 F.3d 1475, 1480, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994); *Intervet America Inc.* v. *Kee-Vet Lab. Inc.*, 887 F.2d 1050, 1053, 12 USPQ2d 1474, 1476 (Fed. Cir. 1989).

Pursuant to 35 U.S.C. § 112, 2nd paragraph, the language of the claims must particularly point out and distinctly claim the subject matter that the applicant regards as the invention. Therefore, *the specific physical structure or physical characteristics of the planar and/or cubical gratings (i.e. the cell-to-cell spacings and the surface-to-surface spacings that are controlled in two or more physical dimensions, which form a planar or cubical, as illustrated in Figure 12 and Figure 13, respectively) of the present invention must be incorporated into the claims.* The specification discusses the physical structure of the gratings illustrated in Figure 12 and Figure 13, but does not clearly define special definitions of either the term "planar grating" or the term "cubical grating".

Applicant second states that Grann teaches a plurality of one-dimensional grating filters that operate in one optical dimension. The plurality of gratings (10a, 10b...10n) disclosed in Figure 3 of Grann et al. are optically multi-dimensional because each

planar grating receives a light beam in one direction and diffracts that light beam in a second, orthogonal direction.

Applicant third states that the grating filters of Grann work sequentially and not concurrently. Examiner disagrees. The multi-dimensional grating disclosed in Figure 3 of Grann et al. may receive and diffract all of the light beams concurrently.

Applicant fourth states that the Office action mailed March 19, 2003 does not address the limitations of claims 5, 6 and 39 at all. The limitations of claims 5, 6 and 39, however, were addressed.

Regarding claims 5 and 39; a plurality of wavelengths is a range of wavelengths. On page 4 of the Office action mailed March 19, 2003, it is stated that, "the multi-dimensional grating has characteristics suitable for diffracting a plurality of wavelengths concurrently" and on page 5 of the Office action it is stated that, "light sources that produce either single or multiple wavelengths are well known...one of ordinary skill in the art would have found it obvious to use either multiple or single light sources to generate the multiple light signals". Light sources that produce multiple wavelengths inherently produce a range of wavelengths and since the multi-dimensional grating diffracts a plurality of wavelengths, it inherently diffracts a range of wavelengths. Thus, the limitations of claims 5 and 39 were addressed.

Regarding claim 6; on page 4 of the Office action mailed March 19, 2003, it is stated that, "wherein the multi-dimensional grating is a cubical grating formed by an array of planar gratings (10a, 10b, 10c, 10d, 10e)", thus addressing the limitation that a planar grating is disclosed.

Applicant fifth states that claim 8 recites a cubical grating and not how it is formed, while the Office action states, "wherein the multi-dimensional grating is a cubical grating formed by an array of planar gratings".

The planar gratings (10a, 10b, 10c, 10d and 10e) in Figure 3 of Grann et al. are arranged to form a cubical grating or cubical gratings. Therefore, a cubical grating is disclosed by Grann et al. and that grating is optically active in multiple dimensions as discussed in detail above with respect to Applicant's first argument.

Applicant sixth states that Grann does not teach or reasonably suggest any use for a plurality of its simple blocks.

A grating block may be formed by any one or any adjacent two planar gratings in the invention of Grann et al. Therefore, the multi-dimensional grating disclosed in Figure 3 of Grann et al. may be thought of as being comprised of several blocks, wherein each block includes at least one of the planar gratings. Therefore, the invention of Figure 3 of Grann et al. could be viewed as a two input block to a one output block arrangement. Additionally, the output grating block could be formed by gratings 10a and 10b and, thus, the invention may include a cubical output grating block.

Conclusion

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (703) 305-5327. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on 703-308-4819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (703) 308-0956.

MRCC
Michelle R. Connelly-Cushwa
Patent Examiner
September 8, 2003

Ullah
AKM ENAYET ULLAH
PRIMARY EXAMINER